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Professor Joshua Lederberg
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Dear Joshua :

I am grateful to you for sending my M.S. to P.N.A.S. and thank you very much for your kindness on this matter.

I am continuing this line of experiment, as follows. We searched for the mutants defective in either one of the 6 penicillin binding proteins, hoping to find real lethal targets of penicillin which were the indispensable part of the machinery for cell growth and division of E. coli, as you have worked out many years ago.

We succeeded to isolate all of such mutants from my mutant collection, except a mutant lacking the band 5/6. The mutants lacking in 1b arrested cell growth at 42° and those lacking in 2 showed an ovoid cell shape at 40° as Spratt and Pardee described. The mutants lacking in 3 formed multinucleated filamentous cells at 40°, as Spratt speculated. No thermosensitive mutation associated with the defect of the penicillin binding protein 1a and 4. I tentatively conclude that the lethal targets of penicillin are 1b, 2, and 3. We are now studying the phenotypes of these mutants, and interested in the enzyme activities associated with these binding proteins. Also, we are constructing a series of multiple-defect mutants leaving only one of bands; 1b, 2, and 3 (and 5/6) and lacking in all other binding proteins. These strains can be useful for separating the binding protein in pure by penicillin-affinity chromatography.

I am hoping to be able to report you the results in my next letter, soon.

Sincerely yours,

Y. Hirota